

## Method of Manufacturing the Fluorescent Surface of a Beam Index Type Color CRT

The present invention relates to a method of manufacturing a fluorescent surface of a beam index type color CRT.

The section of a fluorescent surface of a beam index type color CRT is shown in Fig. 2. The fluorescent screen plate 1 is made of a flat glass plate, on which black substrates b are formed, and red, green, and blue fluorescent bars (R, G, B) are arranged between the substrates in order. On the top of the fluorescent bars, metal thin film 2 made of aluminum is formed. And fluorescent index stripe IDs are further provided on the top of the metal film 2. A funnel shaped casing 3 is sealed to the edges of the fluorescent screen plate with fused glass.

In the beam index type color CRT, electron beams scan the obtained optical output signals to the fluorescent index stripe IDs, for example, the signals can be detected by the electronic-optical receiving elements arranged on the funnel shaped casing, and such elements can yield index signal, and based on the predetermined positions of the fluorescent bars with three colors, receive synchronized color signals.

The fluorescent surface of such beam index type color CRT is generally manufactured in a way as follows. As shown in Fig. 3A, like making a normal fluorescent surface of a shade type color CRT, form a black substrate b on the fluorescent screen plate, form fluorescent color stripes R, G, B, form an organic base 5 layer of acrylic acid resin, and form a metal layer 2 by spraying aluminum in vacuum. Then, overlay the metal layer 2 with a layer of suspensoid of fluorescent material, which is made of photosensitive agents PVA and ADC. After that, bake such suspensoid of fluorescent material, and form a layer of photosensitive fluorescent resin 6. As shown in Fig. 3B, expose the parts of the fluorescent index stripe IDs to an ultraviolet radiation 8 via a mask 7, fix the exposed parts, and then, after washing with water, obtain the fluorescent index stripe IDs as shown in Fig. 3C.

However, in the above conventional way, as the suspensoid of fluorescent index material containing PVA and ADC overlays directly on the top of the metal layer 2 to form a layer of photosensitive resin 6, and then is exposed and developed, fluorescent material 9 may remain on the entire surface of the metal layer 2, resulting in forming unclear fluorescent index stripes which may lead to obscure and disturbed signals. Moreover, if enhancing the pressure of the solution or prolonging the washing time to wash away the remaining fluorescent material 9, it is possible to damage the metal layer 2.

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One object of the invention is to provide a method of manufacturing a beam index type color CRT, in which clear fluorescent index stripes can be yielded without defects existing in the processes of the prior art.

Another object of the invention is to provide a method of manufacturing a beam index type color CRT, in which there is no need to enhance the pressure of the solution or to prolong the washing time, therefore, to avoid the damage of the metal layer.

The above objects can be obtained by the present invention, i.e. form a layer of photosensitive resin, form a layer of fluorescent index layer on the layer of photosensitive resin, and then yield fluorescent stripes by the way of exposing and developing.

According to the method of the invention, due to the layer of the photosensitive resin, the layer of the fluorescent index material and the metal base layer do not contact directly, and the useless parts of the layer of the fluorescent index material and the uncured layer of the photosensitive resin can be removed by exposing and washing. Therefore, unnecessary fluorescent material can be avoided.

The features and benefits of the present invention can be understood by reading the elaborate description and the drawings below.

Figs. 1A-1D show the manufacturing steps of the present invention.

Fig. 2 shows the cross-section view of a traditional fluorescent surface of a beam index type color CRT.

Figs. 3A-3C illustrate the manufacturing steps of beam index type color CRTs.

The present invention will be illustrated by reference to Figures 1A - 1D.

As shown in 1A, form in order a black substrate b on the fluorescent screen plate, form fluorescent color stripes R, G, B, form an organic base 5 layer of acrylic acid resin, and form an aluminum metal layer 2 by spraying in vacuum. On the metal base layer 2, paint a layer of photosensitive material comprising PVA and ADC by means of printing circuit process. A layer of photosensitive resin 10 is formed after the photosensitive material is baked, and the thickness of the layer is 0.5 to 1 micrometer.

As shown in Fig. 1B, on the photosensitive resin layer 10, paint a layer of suspensoid of fluorescent material by means of printing circuit process also. A layer of fluorescent material 11 is formed after baking, and the thickness of the layer 11 is 10 micrometer. Due to the adoption of the printing circuit process,

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the layer of the photosensitive resin is not damaged.

As shown in Fig. 3C, in order to form a part of the photosensitive resin layer 10 having fluorescent index IDs, a photo mask 7 is used to expose the part to ultraviolet radiation 8 to cure the part. After exposing and developing, wash the layer 10 with water immediately, then the unexposed parts of the layer of the photosensitive resin and the corresponding parts of the fluorescent index stripes are washed away, therefore, obtain the fluorescent index stripes IDs as shown in Fig. 1D.

In the embodiment, due to the layer of the photosensitive resin 10, the layer of the fluorescent index material and the metal base layer do not contact directly, and the useless parts of the layer of the fluorescent index material 11 and the unexposed parts of the layer of the photosensitive resin 10 can be removed by exposing and washing. Therefore, unnecessary overlaying of the useless fluorescent material layer on the metal base layer 2 can be avoided.

From the above, it can be seen that, according to the processing method of the present invention, due to a layer of photosensitive resin 10, the layer of fluorescent index material 10 do not contact with metal base layer 2. In addition, as the useless parts of the layer of the fluorescent index material 11 and the corresponding uncured parts of the layer of the photosensitive resin 10 are washed away, the fluorescent material will not remain on the uncovered metal base layer 2 occurring in traditional ways. Therefore, the clear fluorescent index stripes can be obtained, and leading to satisfied results. According to the method of the present invention, there is no need to enhance the pressure of the solution or to prolong the washing time to wash away the remaining fluorescent material, since in that way it is possible to damage the metal layer 2.

Although the present invention has been described with respect to preferred embodiments, one of ordinary skill in the art will appreciate that the present invention can be implemented in modified ways within the spirits of the invention.

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## Claims

1. A method of manufacturing a fluorescent surface of a beam index type color CRT, the CRT has fluorescent color light emitting units fixed on the surface of the fluorescent screen and a layer of thin metal film, the method comprises:
  - forming a layer of photosensitive resin on the metal base layer;
  - forming a layer of fluorescent index material on the layer of photosensitive resin;
  - exposing the layer of photosensitive resin via a mask;
  - forming cured fluorescent index material stripes on the metal base layer by developing;
  - washing away the uncured layer of resin and the corresponding layer of fluorescent material.
2. A method of claim 1, wherein prior to painting the color units and the metal base layer, painting the black substrates on the fluorescent screen.
3. A method of claims 1 or 2, wherein the metal base layer is deposited in vacuum.

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A chinese cited reference

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[54] 发明名称 电子束指引彩色阴极射线管荧光表面  
制造方法

## [57] 摘要

制造电子束指引彩色阴极射线管的荧光表面的一种方法。该管包含有依次涂敷在金属底层上的光敏树脂层和指引荧光材料层, 然后进行曝光、显影和冲洗掉没有被显影出的树脂层以制成清晰的指引荧光材料条纹。由此就能保证得到清晰的指引荧光条纹和令人满意的指引信号。增加冲洗水的静压力或延长冲洗的时间都不是金属底层所希望的, 因而在本方法中能够避免这种情况。

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# 权 利 要 求 书

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1. 一种制造电子束指引彩色阴极射线管荧光表面的方法，

该阴极射线管具有固定在荧光屏面上的荧光彩色发光单元以及一覆盖在该单元上的薄金属层，

该方法包括：

在所说的金属底层上形成一层光敏树脂层；

在所说的光敏树脂层上形成一层指引荧光材料层；

通过一预定的掩模对所说的树脂层曝光；

经过显影，以形成固定在所说的金属底层上的固化的指引荧光材料条纹；

最后冲洗掉未固化的树脂层及其上面相应的荧光材料层。

2. 权利要求1 所限定的方法，其中在涂制彩色单元和金属底层之前，先将黑色基体涂覆到所说的荧光屏面上。

3. 权利要求1 或2 所限定的方法，其中所说的金属底层是由真空沉积形成的。



## 电子束指引彩色阴极射线管的荧光表面制造方法

本发明是涉及一项电子束指引彩色阴极射线管荧光表面的制造方法。

电子束指引彩色阴极射线管的荧光表面的横截面如图2所示。荧光屏面板1是由平面玻璃板所制成的,在该面板上形成了黑色基体b,在每一条黑色基体之间依次排列着对应于红、绿、和兰色的荧光条R、G、B。在彩色荧光条R、G和B的上面制成了如用铝的薄膜所做的金属底层2,在该底层2的上面再进一步制成指引荧光条纹ID。漏斗形的管外壳3用熔融的玻璃4与荧光屏面板的边缘作密封联接。

在指引型阴极射线管中,由电子束向指引荧光条纹ID扫描所获得的光学输出信号,例如能被排列在漏斗形管壳上的光电接收元件检测出来并产生指引信号,再根据该信号预定三原色的荧光条R、G和B的位置,来接收彩色同步信号。

这种类型的电子束指引彩色阴极射线管的荧光表面通常是按照下列方法制造的。如图3A所示,如与通常荫罩式彩色阴极射线管的荧光表面的式样一样,在荧光屏面板上做上一层黑色基体b、彩色荧光条纹R、G、B,一层如用丙烯酸树脂制造的有机的基层5和通过真空喷镀铝而做成的金属底层2。其后,在金属底层2上通过离心方法覆盖上一层指引荧光材料的悬胶,该荧光材料是由聚乙烯醇(PVA)和重铬酸铵(ADC)这样的光敏剂所构成的,该荧光材料的悬胶烘干后就形成了光敏荧光树脂层6。然后如图3B所示,对应于指引荧光条纹ID的部位,通过一张光掩模7用紫外线8进行曝光并固定该被曝光的部位,然后用水进行冲洗后就得到了如图3C所示的指引荧光条纹ID。

然而在上述的常规方法中，由于含有PVA 和ADC 的指引荧光材料悬胶是直接覆盖在金属底层2 上以形成光敏荧光树脂层6，接着由紫外线进行曝光和显影处理，但荧光材料9 还会残留在金属底层2 的整个表面上，这样就不能得到清晰的指引荧光条纹1D。因此就可能得到模糊的和有干扰的指引信号，此外如果提高冲洗溶液的压力或是增加冲洗的时间以便彻底去除露出来的剩余荧光材料9，但这就很可能损坏金属底层2。

本发明的一个目的是提供一种生产电子束指引彩色阴极射线管的方法，该方法没有先前工艺生产时的缺点而能够获得清晰的指引荧光条纹。

本发明的另一个目的是提供一种生产电子束指引彩色阴极射线管的方法，该方法不需要增加冲洗溶液的压力或延长冲洗的时间，因而能避免损坏金属底层。

根据本发明就能实现上述的目的，这是借助于金属底层上先制成一层光敏树脂层，再在该层上制成一层指引荧光层，然后采用曝光和显影的方法以制成指引荧光条纹的方法。

根据本发明的这个方法，由于有了光敏树脂层，指引荧光材料层和金属底层不直接接触，而且指引荧光层的无用部位能够和先前涂盖上的未固化光敏树脂层通过曝光和冲洗的方法一起被去除掉。因此能够避免出现多余的荧光材料。

通过阅读本发明的详细说明及其附图可以清楚地得知本发明的特点和优点。在这里：

图1A到1D表示根据本发明所采用的生产步骤，

图2 表示普通电子束指引彩色阴极射线管荧光屏面板的横截面，

图3A到图3C用图解的方法表示生产一般电子束指引彩色阴极射线管的工艺步骤。

本发明现将通过参考图1A到图1D来作具体的说明。

如图1A所示，在荧光屏面板1 上先后制成黑色基体b，彩色荧光条纹



R、G、B,一层如用丙烯酸树脂制造的有机层5 和通过真空喷镀铝而制成的金属底层2。在该金属底层2 上借助于印刷电路工艺涂刷上一层由聚乙烯醇(PVA)和重铬酸铵(ADC)所构成的光敏材料,其烘干后就形成了光敏树脂层10,该层厚度例如为0.5 到1 微米。

然后如图1B所示,在该光敏树脂层10上也借助于印刷电路工艺涂刷上一层包含有指引荧光材料的悬浮胶,经烘干后就形成指引荧光层11,该荧光层的厚度为10微米,由于采用印刷电路的涂刷工艺所以不会损坏光敏树脂层10。

再如图1C所示,要制成具有指引荧光条ID的光敏树脂层10的部位,用光掩模7 进行紫外线8 照射下的曝光以使固化。曝光后并经显影后该层10立即用水进行冲洗,光敏树脂层没有被曝光的区域和对应的指引荧光层11的区域一起被水冲洗掉,这样就得到了如图1D所示的指引荧光条纹ID。

在本实施方案中,由于存在光敏树脂层10而避免了指引荧光材料层11与金属底层2 的直接接触,此外又由于指引荧光层11的无用区域和光敏树脂层10所相对应的没有被曝光的区域一起被冲洗掉,因此无用部位的荧光材料层11在金属底层2 上的覆盖就能够避免。

由上述说明可知,根据本发明的工艺方法,由于中间有一层光敏树脂层10而不会使得指引荧光材料层11与金属底层2 直接接触,另外由于指引荧光层11的无用部位是和相对应的光敏树脂层10的未固化区域一起被冲洗掉,所以荧光材料就不会像用普通生产方法那样会沉积在未覆盖的金属底层2 上。所以根据本发明的方法就能够得到清楚界定的指引荧光条纹,由此而得到令人满意的信号。根据本发明的方法就没有必要增加冲洗所需的时间或增加冲洗用的静水压,而这样做就可以避免损坏金属底层2。

本领域中的技术人员会清楚地理解,上述描述是用优选的实施方案



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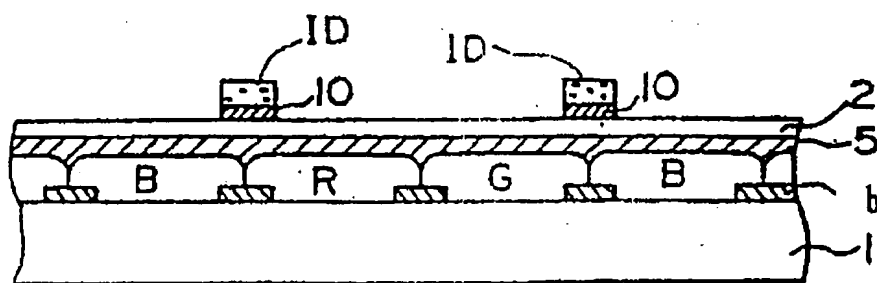
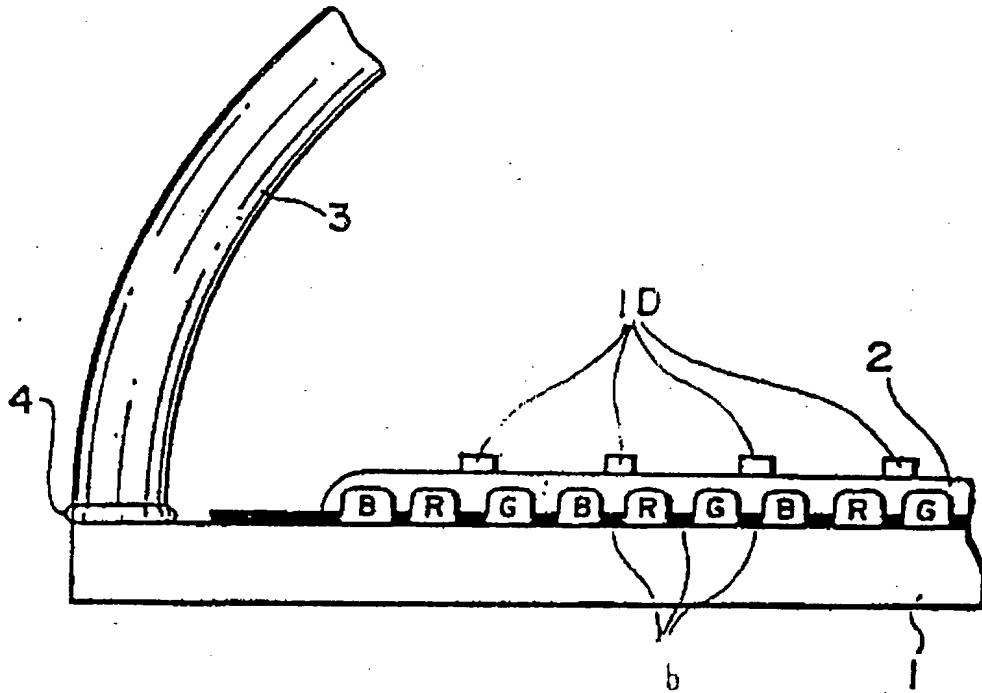


图 2





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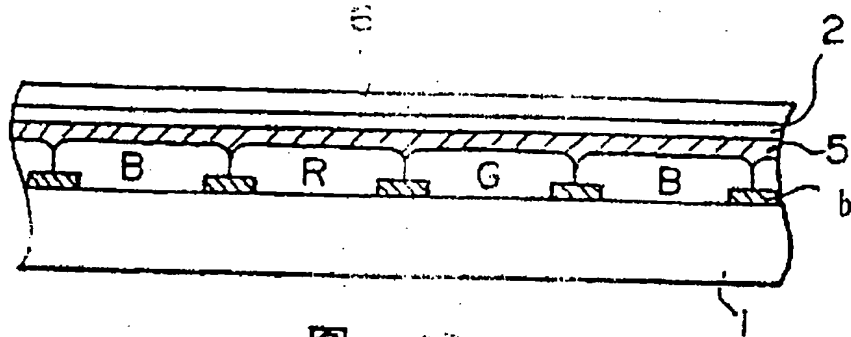


图 3B

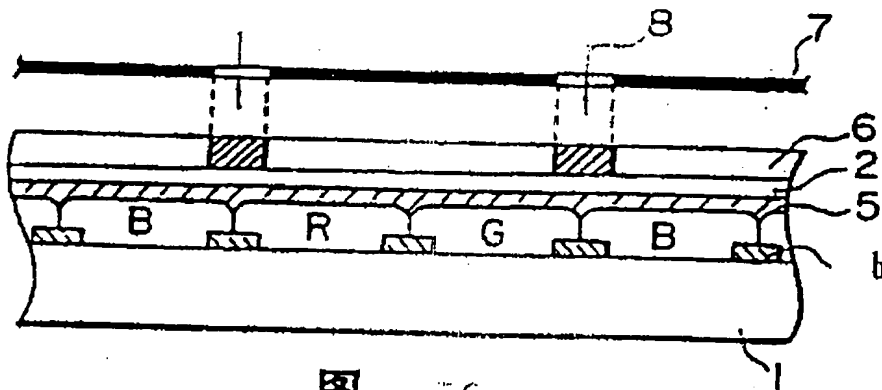


图 5C

